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Writing a Medical Article: Guidelines for Prospective Authors

SUMMARY

This article provides prospective authors with guidelines on the writing of a scientific paper. (*Can Fam Physician* 1987; 33:2249–2252.)

RÉSUMÉ

Cet article offre aux éventuels auteurs des directives sur la façon de rédiger une publication scientifique.

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> The Man of Science appears to be the only man who has something to say just now—and the only man who does not know how to say it.
> *Sir James Barrie*[1]

> I feel disloyal but dauntlessly truthful in saying that most scientists do not know how to write . . . they write as if they hated writing and wanted above all else to have done with it.
> *P.B. Medawar*[2]

ALL WRITERS are made; none are born. Many of them learn through bitter experience. This article offers prospective authors guidelines for writing a scientific paper. Doctors who lack confidence in their ability to write may not find the time to write. They may fear rejection and become discouraged. They may be apprehensive that by submitting a paper, they are creating a stick with which to beat their own self-esteem, and thus they may place publication low on their priority list.

Take my advice: you need not be a gifted writer in order to write a medical paper. What you do require is the time and courage and give it a try. Remember, it is practice that makes perfect.

Why Should You Write?

> You'd better put something on paper—after all, you have a wife and two children to support!
> *Anonymous Department Chairmen*[3]

There is some truth in the saying "Publish or perish," for academic appointments and advancement are often based on the number of papers an applicant has published and the journals in which those papers have appeared. Even one's own self-esteem may be bound intimately with one's publication record. Do not suppose, however, that medical writing is reserved only for the academicians in the ivory tower. You may want to write because you would like to share your knowledge with your professional colleagues, to contribute to continuing education, to add something new to the medical literature, to impress others, or to satisfy yourself.

A prospective author is like a woman about to give birth. "She is sad because her hour of suffering has come; but when the baby is born, she forgets her suffering, because she is happy that a baby has been born into the world."[4] Similarly, an author's joy is beyond measure when his or her paper is accepted. Medical writing can be addictive. According to Marriott, "The itch to write is an infection worth catching: for writing, properly undertaken, 'maketh the exact man' which every man of science must surely strive to be."[5]

What Can You Write?

If you read the current medical journals, you may be able to pick up some points in the recently published scientific articles that you want to challenge or support. It is not difficult to have a 'Letter to the Editor' accepted because, in most journals, these letters need not go through the peer-review process. Moreover, editors are sympathetic in the matter of publishing letters which evidently come from faithful readers of the journal. If you decide to write a letter, make sure that it contains a point from which others can learn. Make your letter short and specific. Try to be polite and not to use emotional language even if you are writing to disagree with another author. Mark your letter clearly "For publication" so that the editor does not assume that it is just for her or him to read.

As letters to the editor do not usually have as much scientific value as medical articles, you should set your goal a bit higher. The next step would be to write some case reports. You may have encountered some interesting patients or rare conditions and you want to share information about them with your colleagues. You do not need much time and experience to write up a case report. A case may represent a new finding, an unexpected association of two rare conditions, an adverse drug reaction, or recovery from an invariably fatal disease.[5] Even if this is not the first case, it is still worth reporting because it helps to confirm other physicians' findings and also shows that the condition may not be as rare as it is presently considered.

Research studies are more time consuming. To write up a prospective

study may take one to three years from the planning stage to the completion of the study. If you want to do some research but have little time for it, you can collaborate with someone who is more experienced. On the other hand, retrospective studies based on chart reviews are much easier to do, although your records will need to be well organized.

Review articles in the more prestigious journals are usually acquired by invitation only. Editors of some of the primary-care journals, however, may consider unsolicited manuscripts. If you plan to write a review article, make sure that the subject is of interest to the readership.

Where to Submit Your Manuscript

Even before you start to write an article, you should survey a number of journals and decide which is the most appropriate for your article. General journals have the advantages of a broader readership and quicker publication. On the other hand, if your article is a specialized one, a specialist journal may be more appropriate. If the article is of local interest only, send it to a local journal. Unless your report is the first one with important findings or your research may influence the ways in which other physicians practise medicine, do not send it to the most prestigious journals. These journals have a notoriously high rejection rate, and you may become discouraged almost from the start. If your report is a confirmatory one, send it to a local or less prestigious journal. Other factors that may influence your decision include the average time required for an editorial decision, the interval between acceptance and publication, the cost of reprints and reproduction of colour illustration(s), if any, and whether the journal follows the uniform "Vancouver" style of references.[7]

Most journals now follow the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" proposed by the International Committee of Medical Editors.[7] If you submit your article to one of these journals, and it is rejected, you may not need to revise the article before submitting it to another journal that has the same requirements.

While reproduction of colour illustrations is quite costly, some journals do absorb this cost. The cost of reprints varies with each journal. Three hundred reprints of a two-page article, for instance, may cost from $100 to $500. You may learn all this from experience, or you may ask a more experienced colleague for information.

Once you have decided to submit your article to a particular journal, go through that journal carefully to ensure that your article follows its style, general format, and editorial policy. Search the indexes of the target journal for the last 10 years for citable articles on the subject. Before submitting a review article, make sure the editorial policy of your target journal does not preclude consideration of unsolicited review articles.

How Many Authors Should Dance on the Head of Your Article?

The word 'author' comes from the Latin verb *augére*, meaning 'to increase, promote or originate'.[8] The International Committee of Medical Editors has provided guidelines on authorship as follows: each author should have participated sufficiently in the work to take public responsibility for the content.[9] This participation must include:

- conceiving or designing the article or analysing and interpreting the data, or both;
- drafting the article or revising it for critically important intellectual content; and
- giving final approval of the version to be published.

Participation solely in the collection of data does not equate with authorship.[9] Unjustified claims of authorship dilute the value of authorship and reduce the credibility of the paper. With very few exceptions, a paper should at least represent more patients than authors!

Whether you should write alone or with someone else depends on your personalities, work habits, and experience. Be mindful of the saying that "Too many cooks spoil the broth." I usually find it easier to write an article by myself, as co-authors may sit on a paper for months. If practicality dictates that you find a co-author for the paper, look for someone who is knowledgeable, experienced, efficient, and devoted. Be sure to inform your co-author about the deadlines, responsibilities, and costs (e.g., photographs, reprints involved).

How to Get Started

> Copying from one book, it has been said, is plagiarism, while copying from two books is research.
>
> *Norman Howard-Jones*[10]

A thorough search of the literature is essential to give you a broader view of the subject you have chosen and to inform you of what has been done before. A library is a good source of information. You can look up the necessary references in *Index Medicus* or do a computer search. The latter method will save you some time but cost you some money. If you have difficulty finding the references you need, go to the librarian for advice.

After completing the literature search, make a copy of every article that interests you and is relevant to the paper you are going to write. You will never find that you have read too many sources. If your library does not possess an article that you think is important, arrange an interlibrary loan. Having a copy of the relevant articles has several advantages. First, you are free to underline all the salient points as you read through the articles. Secondly, you may make notes in the margins of the copy. Thirdly, you are provided with all the bibliographic information that you will need, and so you can double-check your list of references to make sure that it contains no errors. Thus you will avoid repeated trips to the library.

If you are relatively new at writing, read some how-to-write books on medical literature. The time you spend could be well invested if your manuscript is accepted without being sent back for revision. Even professional writers use dictionaries, and so you should keep a dictionary by your side. If you plan to write many more articles in the future, ask your librarian for an old copy of *List of Journals Indexed in Index Medicus*. Thus you will not have to keep returning to the library again to check the abbreviated titles of the various journals.

The Writing Process

Take a few hours off, go to a quiet place where there is minimal or no distraction. Sit down and organize yourself. When you have an outline in your mind, write it down. (First write it down, then write it up!)

While you are writing the first draft, do not worry about grammar, spelling, punctuation, or the choice of words, as these considerations will slow you down. Rather, finish the first draft as rapidly as possible. Then go through it again and polish it. It is a good idea to have scissors and tapes handy: cutting and pasting help you reorganize your paper without too much rewriting. On the other hand, modern word processors have 'cut-and-paste' features that allow efficient revision and they can save you time and effort to have one.

The title of your article should be interesting and informative. Try to indicate in the title what readers can learn from reading your article.

The abstract should be a summary of the whole text. It should be concise and factual, and should not contain information that is not mentioned in the text. Do not mention "something to be discussed" since this may encourage some busy readers to read only the abstract and not the text. I find it easier to write an abstract of an article after I have written the whole text. Below the abstract, provide three or four key words that may be published with the abstract and that will help indexers to cross-index your article.

Your introduction should be short. It should state clearly the purpose of the study and why it should be interesting or important to the readers. Make no attempt to review the literature at this stage.

The "case report" is the easiest and most straightforward part of the paper to write. For this reason I sometimes start with the case history and then proceed to the general introduction and discussion. The case history should be concise and should include all positive findings, as well as significant negative findings. Your account will flow properly if you start with the history of the present illness and proceed to the patient's past health, family history, laboratory investigations, course in hospital, and subsequent outcome.

If you are writing a research study, the next section would be "Patients and Methods". This section should state how patients were selected and how the study was done. This information is usually well spelled out in the study protocol. If the manuscript reports the results of experimental investigations of human subjects, state formally that consent was obtained from the subjects after the nature of procedure(s) was fully explained.

The "Results" section should deal with results only. One common fault of authors is to attempt to interpret results in this section. The proper place for interpretation is in the discussion. There is no need to present the results in both graphic and tabular forms. Choose the form which most clearly and accurately conveys the facts. You can then summarize the important points in the text. It is unnecessary to mention all the results again in the text if they are already well displayed in the tables and figures.

The "Discussion" is usually the most difficult part to write. You might begin by highlighting some of the salient information from the literature and then proceed by stating your results in the light of other authors' findings. Emphasize areas of agreement and disagreement, and try to account for differences. Try to make reference to any of your previous work, since this may give your paper more credibility. If possible, indicate future lines of research.

In the "Acknowledgments" section, acknowledge all those individuals who have made substantive contributions to the study. Send them a copy of the paper when it is published. You will find that this courtesy will make them more willing to help you in future.

In the "References" section, list all the relevant references. These should be up-to-date, although some of the older and classic papers will still need to be cited.

If you have photographs to illustrate your manuscript, make sure that you label the back of each one, showing the number of the figure, the names of the authors, and the top of the figure. Otherwise, the photographs may be lost in the editorial office or be printed upside down. All photographs of patients which disclose their identity must be accompanied by the subject's signed permission for its use, or the processing of your manuscript may be delayed. Legends for illustrations should be typewritten on a separate page and numbered to correspond to the figures.

Second Opinion

Give your paper to a colleague to read. Remember, you are asking for constructive criticism and not compliments. It is important to find someone who is capable, will tell you the truth, and can take time to read your paper carefully.

Sending Your Manuscript Out

When sending your manuscript to the editor, include a covering letter stating that you are submitting the manuscript for consideration for publication, that it is not under consideration by any other journal, and that you are willing to make appropriate changes on his/her recommendation. Find out the name of the editor so that you can address him/her by name.

Reread the journal's "Instructions to Authors" to make sure that you are submitting the right number of copies and that the format meets the journal's requirements.

Photographic prints must be packed between sheets of heavy cardboard that are larger than the material you wish to protect.

Double-check the address of the editorial office, including the postal code. Since some journals do not accept registered mail, send your manuscript by first-class airmail. Remember to affix sufficient postage to the envelope.

The Rejected Article

Do not be disappointed or discouraged if your paper is rejected. Important papers by such notables as Mendel and Krebs had their share of rejection.[11] Editors must reject many good papers they would prefer to publish because of the large numbers of papers submitted. In some journals, the rejection rate is as high as 90%.

Reviewers are considered "gatekeepers" of science on whose recommendations the editor will decide whether or not to publish a particular paper. The peer-review system has its faults. Peter and Ceci[12] randomly selected 12 published papers written by well-known authors based at prestigious universities and altered the titles, names and institutions to represent new, unknown authors with odd-sounding institutional affiliations. They then resubmitted the papers to the same 12 journals that had published the articles 18 to 32 months previously. Three of the papers were spotted as resubmissions, but eight of the remaining nine articles were unanimously rejected by both the editors and the referees. The Matthew effect[13] (the big gets bigger and the small gets nowhere) and the influence of the au-

thor's status in easing access to publication cannot be disregarded.

Having been a writer and a reviewer, I understand the system from both points of view. The review process is necessary to protect the readership and maintain the scientific standard of journals. If journals published all the material submitted to them, publication would no longer be an achievement. Some reviewers are 'doves' who believe that having a borderline paper published is not a sin, but having a reasonable paper rejected is a shame. Others are 'hawks' who regret the rejection of a good paper less than the publication of a poor one. It is well known that an editor can determine the fate of a paper by selecting a particular reviewer.[14, 15] A rejected author may complain bitterly to the editor, but it makes as much difference as complaining about weather. Providing your paper is a good one, it will eventually be published if you keep trying. Of the papers rejected by *The Journal of Clinical Investigation* in 1970, 85% were subsequently accepted and published elsewhere.[16] Thus editors and reviewers act only as traffic officers, but not as the ultimate gatekeepers of science; they can influence only where papers are published and when they are published, not what is published.

The most important cause of non-publication is non-persistence on the part of a disappointed author. When your paper is rejected, read carefully the constructive comments of the reviewers, and revise your paper accordingly. If you are certain that the reviewers are wrong, simply ignore their comments, select another journal, and resubmit your paper as soon as possible. Make sure that the manuscript you send is a clean one, bearing no marks from its submission to the first journal you applied to.

If Your Article Is Accepted

Sooner or later, you will receive a short note from an editor thanking you for your excellent article and your contribution to the journal, and asking you to consider the journal for submission of future manuscripts. After that, it may be several months before your paper is actually published. In the meantime, you will be sent the galley proofs. This is your last chance to make any corrections. Check all proofs against your original copy, scrutinize the text for typographical errors, pay close attention to the queries the publisher or editor may have placed on the proofs for your consideration, and make changes that are essential. While you are waiting to have your first paper published, you can start working on another.

If, after reading my manuscript, you have decided to give medical writing a try, then I have achieved my objective. I am optimistic that your paper will be accepted. Good luck, and have fun! ◉

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